

FIG. 3
(Claim 21)



US006163554A

United States Patent [19]
Chang et al.

[11] **Patent Number:** **6,163,554**
[45] **Date of Patent:** **Dec. 19, 2000**

[54] **OPTICAL FIBER RAMAN LASER**

[75] **Inventors:** Do IL Chang; Ho Young Kim; El Hang Lee, all of Daejeon, Rep. of Korea

[73] **Assignee:** Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea

[21] **Appl. No.:** 09/162,568

[22] **Filed:** Sep. 29, 1998

[30] **Foreign Application Priority Data**

May 26, 1998 [KR] Rep. of Korea 98-19072

[51] **Int. Cl.⁷** H01S 3/067

[52] **U.S. Cl.** 372/6; 372/3

[58] **Field of Search** 372/6, 3

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,794,598 12/1988 Desurvire et al. 372/3
5,323,404 6/1994 Grabb 372/6
5,815,518 9/1998 Reed et al. 372/6

OTHER PUBLICATIONS

Jean-Luc et al., Fiber Gratings in Lasers and Amplifiers, Journal of Lightwave Technology, vol 15, No. 8, Aug. 1997, pp. 1378-1390.

S.V. Chernikov, et al., High-power, compact, high-efficiency, fiber laser source around 1.24 μm for pumping Raman Amplifiers, OFC '97 Technical Digest, pp. 345 (No month).

Primary Examiner—James W. Davie

Attorney, Agent, or Firm—Cohen, Pontani, Lieberman & Pavane

[57] **ABSTRACT**

An optical fiber Raman laser includes an optical fiber which is a nonlinear optical medium, for implementing a nonlinear Stokes frequency shift; a wavelength-division multiplexing optical fiber coupler means, coupled to said optical fiber in parallel, for separating each Stokes frequency shifted wavelengths and pump wavelength, for internally resonating the Stokes frequency shifted light wavelengths and for output-coupling said laser output light which is a second order Stokes frequency shifted wavelength; a first fiber Bragg grating means connected to said wavelength division multiplexing (WDM) optical fiber coupler means in serial, for transmitting light of the pump source and for selecting output wave of the Raman laser; and a second fiber Bragg grating means connected to said wavelength division multiplexing (WDM) optical fiber coupler means, which has maximum reflectivity on the wavelength of the pump source, for full-reflecting and re-inputting the light of the pump source to said optical fiber.

5 Claims, 5 Drawing Sheets

